DOCUMENT RESUME

ED 141 468 UD 017 102

AUTHOR Slavin, Robert E.
TITLE Student Learning Teams and Scores Adjusted for Past Achievement: A Summary of Field Experiments. Report No. 227.
INSTITUTION Johns Hopkins Univ., Baltimore, Md. Center for the Study of Social Organization of Schools.
SPONS AGENCY National Inst. of Education (DHEW), Washington, D.C.
PUB DATE Apr 77
CONTRACT NE-C-00-3-0014
NOTE 29p.

EDRS PRICE MF-$0.83 HC-$2.06 Plus Postage.
DESCRIPTORS Academic Achievement; Educational Programs; English Instruction; Grade 7; *Grouping (Instructional Purposes); Peer Groups; Program Evaluation; *Secondary Education; *Small Group Instruction; Social Relations; Student Grouping; Student Motivation; *Teaching Methods; *Teamwork
IDENTIFIERS Maryland (Baltimore)

ABSTRACT

This paper describes a study which evaluates two classroom innovations directed at the problems of student motivation, academic performance, and social perceptions. These innovations, "Student Learning Teams" and "Academic Divisions," are evaluated in a two by two factorial field experiment in eight seventh grade English classes (the teams and divisions versus no teams, no divisions comparison was replicated in two additional schools.) The treatments were as follows: Control students worked individually. Cooperative work was allowed, but not encouraged. Students received scores on their quizzes. No Teams, Achievement Divisions: Same as control, except that students were assigned to homogeneous achievement divisions based on past grades in English. At the end of each week, each student's score on the sum of two quizzes was compared to that received by the others in his or her division. Students' individual divisional points were reported in a weekly class newsletter. Teams, No Achievement Divisions: Same as control, except that students were assigned to teams. Each team was made up of a high achiever, a low achiever, and average achievers. Students tutored each other. At the end of the week, a newsletter announced the teams with the highest point averages. Teams and Achievement Divisions: This treatment incorporated both the team and division components. In summary, the results are favorable toward the Student Teams- Achievement Divisions (STAD) combination. STAD is more effective than the control in increasing academic achievement, peer support for academic performance, liking of others, and number of students cited as friends. (Author/JM)

Documents acquired by ERIC include many informal unpublished materials not available from other sources. ERIC makes every effort to obtain the best copy available. Nevertheless, items of marginal reproducibility are often encountered and this affects the quality of the microfiche and hardcopy reproductions ERIC makes available via the ERIC Document Reproduction Service (EDRS). EDRS is not responsible for the quality of the original document. Reproductions supplied by EDRS are the best that can be made from the original.

ED141468

STUDENT LEARNING TEAMS AND SCORES ADJUSTED FOR PAST ACHIEVEMENT: A SUMMARY OF FIELD EXPERIMENTS

CONTRACT NO. NE-C-00-3-0114

Robert E. Slavin

UD 17102

REPORT NO. 227

April 1977

U S DEPARTMENT OF HEALTH
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY.

Published by the Center for Social Organization of Schools, supported in part as a research and development center by funds from the United States National Institute of Education, Department of Health, Education and Welfare. The opinions expressed in this publication do not necessarily reflect the position or policy of the National Institute of Education, and no official endorsement by the Institute should be inferred.

The Johns Hopkins University
Baltimore, Maryland

Introductory Statement

The Center for Social Organization of Schools has two primary objectives: to develop a scientific knowledge of how schools affect their students, and to use this knowledge to develop better school practices and organization.

The Center works through three programs to achieve its objectives. The Schools and Maturity program is studying the effects of school, family, and peer group experiences on the development of attitudes consistent with psychosocial maturity. The objectives are to formulate, assess, and research important educational goals other than traditional academic achievement. The program has developed the Psychosocial Maturity (PSM) Inventory for the assessment of adolescent social, individual, and interpersonal adequacy. The School Organization program is currently concerned with authority-control structures, task structures, reward systems, and peer group processes in schools. It has produced a large-scale study of the effects of open schools, has developed the Teams-Games-Tournament (TGT) instructional process for teaching various subjects in elementary and secondary schools, and has produced a computerized system for school-wide attendance monitoring. The School Process and Career Development program is studying transitions from high school to post secondary institutions and the role of schooling in the development of career plans and the actualization of labor market outcomes.

This report, prepared by the School Organization Program, describes a study of two classroom innovations, Student Learning Teams and Achievement Divisions, and their effects on student achievement, attitudes, and interpersonal relations.

Abstract

This paper describes a study which evaluates two classroom innovations directed at the problems of student motivation, academic performance, and social perceptions. These innovations, Student Learning Teams and Achievement Divisions, are evaluated in a 2 X 2 factorial field experiment in eight seventh grade English classes, and the teams and divisions vs. no teams, no divisions comparison was replicated in two additional schools. Results indicated generally positive effects of the teams-divisions combination on academic achievement, and team effects on peer tutoring, liking of others, and peer support of academic performance.

Acknowledgments

The author wishes to thank the following individuals for their help in executing this work. J. Richard Lewis, Wanda Summers, Frances Menconeri, Constance Strasberger, Helen Dinh, and Robert Cavanaugh of the Frederick County (Maryland) Public Schools; Joel Carrington and Elizabeth Ponds of the Baltimore City Schools; and others who read drafts of this report, including David L. DeVries, John S. Wodarski, and John Hollifield.

One of the dominant theories of motivation in psychology is expectancy theory (Atkinson, 1958), which holds that an individual's motivation to perform a given task is a function of his probability of success at the task and the incentive value of success at the task. This is expressed as a multiplicative function; if both factors are high, motivation will be high, but if either is low, motivation will be low.

In traditional classrooms, both probability of success and incentive value of success may be low for many students. Probability of success is often particularly low for low performing students, who may have little or no chance of receiving an acceptable grade (an "A" or "B") regardless of their effort or performance. Slavin (1977) has pointed out that motivation is highest when the difference between the probability of success given maximum effort and the probability of success given minimal effort is at a maximum. For low performing students, this difference is near zero (because the probability of success given maximum effort is very low). For high performing students, the probability of success for maximum effort may be no higher than the probability of success given minimal effort, so such students may not be motivated to work as hard as they could.

Incentive value of success in traditional classrooms may also be particularly low for some students. The motivational ability of grades for all students is probably low because of the infrequency with which they are given, and may be even lower for students whose parents are not concerned about grades, for students who feel that

getting good grades is socially disapproved, and for others who are simply unconcerned.

This study investigates the use of student teams to increase the incentive value of success to students, and the use of achievement divisions to increase the probability of success given maximum effort (and reduce the probability of success given minimal effort).

The use of student teams to increase the incentive value of success draws on a long tradition of research in social psychology. If individuals are rewarded as a group or team for some group performance, they will socially reward each other for performance which leads the group toward its goal (Deutsch, 1949). The use of teams in classrooms is thus an attempt to mobilize peer support for academic performance, thereby increasing the incentive value of success for all students. In addition, student team techniques have consistently increased mutual attraction among students as well as other dimensions related to social development (Slavin, in press; Johnson and Johnson, 1974).

Classroom research on student teams has indicated that team techniques can have positive effects on academic achievement if they are constructed in certain ways. Some of the most effective team techniques have been Teams-Games-Tournament, or TGT (DeVries and Slavin, 1976) and the Low Performer Contingency (Hamblin, Hathaway, and Wodarski, 1971). Both techniques involve individual performances which contribute to a team score, and both provide opportunities for students who have been low performers in the past to contribute as much or more than high performers to their teams' scores. The team techniques reported in the present paper are primarily in the tradition

of the TGT research, and represent an attempt to apply essentially the same principles to a more simplified and adaptable format.

A very old principle in the psychology of motivation is that if competition is used as a motivational technique, competitors must be equal in ability (see Clifford, 1971). When competitors are equal, each competitor can substantially increase his probability of success by exerting extra effort (and can reduce his probability of success by slacking off). In spite of the long-standing nature of this observation, students in most classrooms are still compared to the entire class. The Achievement Division is a technique which allows each student's performance to be evaluated only in relation to the performance of others who are comparable in past achievement.

METHOD

Design

Student Teams and Achievement Divisions were evaluated in 2 x 2 factorial design in a junior high school in the principal town of a rural county (School 1). The combined Student Team-Achievement Division (STAD) was further evaluated in a rural-suburban junior high school in the same county (School 2) and in a junior high school in a large eastern city (School 3).

In School 1, eight intact seventh-grade English classes (N=124) were randomly assigned to four experimental treatments in a 2 x 2 (Student Teams x Achievement Divisions) factorial design. The no-student-team, no-achievement-division cell served as a control. Four teachers administered the treatments. Each teacher taught two classes using two different techniques. The teachers were assigned to treatments

in a counter-balanced fashion, so that teacher effects are distributed across both main effects. The design is depicted in Figure 1, below.

Insert Figure 1 About Here

STAD vs. Control Replications

Six intact seventh-grade English classes (N=173) taught by the same teacher in School 2 were randomly assigned to experimental (STAD) and control conditions. The three STAD classes received a treatment identical to that received by the teams-divisions groups at School 1, while the three control classes were the same as the no teams-no divisions group at School 1. Also, two intact seventh grade English classes (N=65) taught by the same teacher in School 3 were assigned to experimental and control treatments as at School 2. While only two students at School 1 (2%) and no students at School 2 were black, 39 students (60%) at School 3 were black.

Treatments

All sixteen classes in the study studied the same language arts curriculum, which covered such areas as punctuation, word classes, and capitalization. The treatments were administered over a nine-week period. All classes followed a schedule of instruction which involved a twice-weekly cycle of teacher lecture (about 20 minutes), student work on worksheets (about 40 minutes), and quiz (about 15 minutes). The teacher lectures and quizzes did not vary across treatments; the experimental manipulations took place only during the worksheet periods. To minimize possible "Hawthorne Effects," all teachers

(including control) were given similar-appearing teacher manuals, and were told that each treatment was of equal interest to the experimenter. The treatments were as follows:

No Teams, No Divisions (Control -- all schools). Students followed the schedule outlined above. During worksheet periods students worked individually. Cooperative work was allowed, but not encouraged. Students received percentage scores on their returned quizzes and did not receive newsletters.

No Teams, Achievement Divisions (School 1 only). Same as control, except that students were assigned to homogeneous achievement divisions based on past grades in English. At the end of each week, each student's score on the sum of the two quizzes was compared to that received by the others in his or her division. The high scorer in a division received eight points; second scorer, six points; third, four points; and all others, two points. In addition, the high scorer in each division was "bumped" to the next higher division, where competition for divisional points was likely to be more difficult. This "bumping" corrected for inaccurate placement of students. When the highest division reached a size of nine due to the bumping, it was split into two new divisions; when the lowest shrank to three, it was absorbed into the second lowest division. Students' individual divisional points were reported in a weekly class newsletter prepared by the teachers. The newsletter praised students who earned eight, six, or four points without mentioning in which division the points were

earned. In this way, each student, regardless of past achievement, had a roughly equal and substantial chance of receiving high scores if he increased his level of performance. Note that students in this condition do not interact in any way. Assignment to an achievement division was envirely a statistical technique to balance initial achievement level. After initial assignment, students were not made aware of each others' achievement division assignments.

Teams, No Achievement Divisions (School 1 only). Same as control, except that students were assigned to teams. Each team was made up of 4-5 students--a high achiever, a low achiever, and two-to-three average achievers. Teams were also balanced with respect to sex. Teammates were assigned adjacent seats during all activities, but they interacted only during the worksheet periods. At these times, students tutored each other on worksheet items. Most teams formed into tutoring pairs or triads to peer tutor, but some worked as a single group. At the end of the week, a teacher-prepared class newsletter announced the teams with the highest point averages (from the sum of the two quizzes). In addition, individual high scorers were commended as having contributed to their team scores.

Teams and Achievement Divisions (STAD - all schools). This treatment incorporated both the team and division components described above. Students were assigned both to achievement-heterogeneous teams and to achievement-homogeneous divisions.

Teams were balanced in respect to sex and (at School 3) race. Points contributed to the team score were determined by the achievement division system. Once again, students interacted only with their teammates, not with their division-mates. The weekly newsletter emphasized team scores, but cited students with high divisional scores as having outstandingly contributed to their teams. Again, while divisional scores were made public, the divisions in which they were earned were not.

Dependent Measures

Four categories of dependent variables were measured in the three schools. They are as follows:

Behavioral Observation. During the last five weeks of the project, behavioral observation of students at Schools 1 and 2 was conducted. The observer was trained to a reliability of .90 to note whether students were 1) on or off task; 2) if on task, working with a peer or alone; and 3) if off task, interacting with a peer or not. Observations were made only during worksheet periods, and all observations in which students were not expected to be on task (such as transition periods) were excluded from the analysis. The observer observed each student in sequence for five seconds, sweeping the class several times in an observation period. Dependent variables were percent of time on task and percent of time on task spent interacting with a peer.

Academic Achievement. Academic achievement was measured on two separate tests, the Hoyum-Sanders Junior High School English Test (standardized) and a treatment-specific test covering the academic material taught in class. Parallel forms of both tests were given as pre- and posttests. In addition, scores on the twice-weekly quizzes in the last three weeks of the program were used as academic achievement measures. The standardized and treatment-specific achievement variables were analyzed using their pre-tests as covariates, and the quiz scores were controlled for Hoyum-Sanders pretest.

Attitudes. Eight 4-5 item attitude scales were administered as pre- and posttests. They are satisfaction, motivation, feeling of being liked, liking of others, peer support for academic performance (e.g., "other students care whether I do well or not in this class), perceived probability of success, incentive value of success, and dependence of outcome on performance (e.g., "If someone does well in this class, it is because they worked hard."). All scales were presented in a Likert-type format, where students were asked to strongly disagree, disagree, agree, or strongly agree with various statements. All attitude scales were analyzed using their pretests as covariates.

Sociometric Measures. Students were asked to name their classmates who were their "best friends in this class" and those who have "helped you with your classwork." Twenty-four spaces were

left for each question, and students were allowed to name as many classmates as they wished. The dependent variable of interest was the number of friends and helpers named by each student, taken to be an indicator of class cohesiveness and peer tutoring, respectively. Both of these measures were analyzed using their pretests as covariates.

Experimental Hypotheses. Positive team and division effects were expected for the following variables: Academic performance, satisfaction, motivation, dependence of outcome on performance, probability of success, and percent of time on task. Team effects only were expected for feeling of being liked, liking of others, peer support for academic performance, incentive value of success, number of friends, number of helpers, and percent of time on task spent working with a peer.

RESULTS

All variables except the behavioral observation were analyzed using an analysis of covariance procedure with treatment vectors entered as coded variables in a multiple regression equation. The behavioral observations were analyzed using a chi square contingency table. Interaction effects at School 1 were computed but ignored, as they are completely confounded with teacher effects. The results are summarized in Table 1.

Insert Table 1 About Here

Behavioral Observation. Systematic behavioral observation was conducted only at Schools 1 and 2, but these observations provide important information on the degree of implementation and results

of the treatments at these schools.

The first measure, peer task (or peer tutoring), is primarily a measure of the degree of implementation of the treatments when applied to the team vs. no team comparison--the team students should peer tutor far more than the no-team students because peer tutoring is actively encouraged in the team treatment while it is merely allowed in the control groups.

At School 1, significant team effects were found for percent of task opportunities rated peer task (χ^2 (1) = 191.85, $p < .001$). Team students peer tutored an average of 82.1% of their task opportunities, while no-team students peer tutored 34.3% of theirs. However, no peer task effects were found at School 2 (χ^2 (1) < 1, n.s.). In fact, the control students peer tutored slightly more than the STAD students at this school, 61.1% of task opportunities for control vs. 56.2% for STAD. This result throws the degree of implementation of the program at this school very much into doubt. The teacher at School 2 was the only one in the study who taught three experimental and three control classes (all other teachers taught two classes, one in each of two conditions). It is possible that with such a large number of classes, this teacher found it difficult to maintain a clear distinction in techniques between the two treatments. In fact, this problem was mentioned by the teacher before the results were known.

A significant division effect was found at School 1 in favor of <u>no</u> divisions (χ^2 (1) = 8.56, $p < .01$). This result is due to a large difference between the frequency of peer tutoring in

the no teams, no divisions groups (44.1% of task opportunities) and that in the no teams, divisions groups (24.4% of task opportunities). The divisions vs. no divisions comparison in the team conditions shows no difference (80.1% for teams, divisions vs. 84.3% for teams, no divisions). This division effect is less surprising when it is remembered that the division treatment is a competitive reward structure. Students may have realized that the student they helped could be a member of their division, and could thus beat them in the competition for divisional points. This probably did not occur in the teams and divisions (STAD) classes, as the emphasis in STAD is on the cooperative, not the competitive aspects of the program. Because of the large difference between divisions and no divisions in the no teams conditions and the small difference in the teams conditions, the team x division interaction is significant (χ^2 (1) = 4.99, $p < .05$)

Academic Achievement. Statistically significant academic achievement effects were found only at School 3, the urban integrated junior high. However, these effects were quite strong. Treatment accounted for 25% of the variance (controlling for pretest) on the standardized Hoyum-Sanders English Test (F (1,63) = 30.76, $p < .001$), 5% on the language arts treatment specific test (controlling for pretest; (F (1,63) = 13.94, $p < .001$). The increases on the Hoyum-Sanders increased the STAD students from the sixth percentile (based on national norms)

to the 32nd, while the control group increased from the third percentile to the sixth. The size of this effect may be due to a "floor" effect in the control group, where pre-test scores approached that which would be expected from random guessing. However, the treatment-specific test does not suffer from this problem. Combining the STAD vs. Control comparisons in the three schools shows STAD to have been more effective than Control on all three measures, the Hoyum-Sanders ($F(1,322) = 3.99$, $p < .05$), the treatment specific test ($F(1,322) = 3.98$, $p < .05$), and the quiz scores ($F(1,322) = 5.90$, $p < .05$). However, there is considerable school-to-school variance in this comparison, ranging from very large treatment effects at School 3 to miniscule differences at School 2.

Attitudes. The results of the eight attitude scales were also mixed. Experimental hypotheses were most strongly supported for the three interpersonal dimensions: feeling of being liked, liking of others, and peer support for academic performance. At School 1, the predicted team effects were observed on liking of others ($F(1,203) = 12.80$, $p < .001$) and on peer support for academic performance ($F(1,203) = 20.58$, $P < .001$), but not on feeling of being liked ($F(1,203) = 2.09$, n.s). However, division effects in favor of the achievement divisions were found on all three variables, feeling of being liked ($F(1,203) = 5.95$, $p < .05$), liking of others ($F(1,203) = 4.02$, $p < .05$), and peer support for academic performance

($F(1,203) = 4.40$, $p < .05$). These effects are hard to explain in light of the somewhat competitive nature of the division treatment and in light of the much lower frequency of peer tutoring observed in the division classes.

No effects on these three variables were found at School 3, and only marginal effects ($F(1,170) = 3.18$, $p < .10$) were found for peer support for academic performance at School 2. The combined STAD vs. Control comparison showed STAD to be marginally higher than Control on liking of others ($F(1,322) = 2.87$, $p < .10$), but significantly higher on peer support of academic performance ($F(1,322) = 12.66$, $p < .001$). Thus, these results provide general support for the frequently expressed theory that team techniques increase mutual attraction and peer norms supportive of the group activity (see Slavin, in press).

Effects of the five other attitude scales were less consistent. A significant team effect on motivation was found at School 1 ($F(1,203) = 3.92$, $p < .05$) and a marginal STAD effect on satisfaction was found at School 2 ($F(1,170) = 3.25$, $p < .10$), but no other effects were observed on these variables. There was also a significant team effect at School 1 on dependence of outcome on performance ($F(1,203) = 4.28$, $p < .05$) and a marginal team effect on perceived probability of success ($F(1,203) = 3.26$, $p < .10$). No effects were found in incentive value of success, at least in part because of a ceiling effect at all three schools.

Sociometric Measures. The results of the sociometric measures further demonstrate the generally positive impact of STAD on interpersonal perceptions. On the question "Who are your friends in this class?", significant team effects ($F(1,203) = 4.80$, $p < .05$) and division effects ($F(1,203) = 4.02$, $p < .05$) were found at School 1. Coupled with positive trends at Schools 2 and 3, these effects led to a significant STAD effect for the combined analysis ($F(1,322) = 7.43$, $p < .01$). Marginal team effects were found for the question, "Who have helped you with your classwork?" at School 1 ($F(1,203) = 2.88$, $p < .10$), and a marginal STAD effect was found at School 3 ($F(1,63) = 3.64$, $p < .10$). The small size of the effect on helping is surprising considering that observation showed the team students at School 1 to peer tutor far more than non-team students. However, the sociometric question asks how many students helped you, while the observation recorded the frequency with which students peer tutored, and while the team students peer tutored far more than Control students, they did so only with their teammates.

Discussion

In summary, the results of the present study are generally favorable toward the Student Teams-Achievement Divisions (STAD) combination. The combined analysis of the three STAD-Control comparisons shows that STAD is more effective than Control in increasing academic achievement, peer support for academic performance, liking of others ($p < .10$), and number of students cited as friends. The strong team and division effects on percent of time on task observed at School 1 suggest that if the treatments are properly implemented, they may result in a change in student behavior toward greater attention to academic tasks. The team effect on frequency of peer tutoring is primarily a measure of the degree of implementation of the team program, but it is also an indication that when students are simply allowed to peer tutor, they do so far less often than when they are assigned to teams. The division effect against achievement divisions for peer tutoring suggests that a non-competitive means of balancing past achievement (such as some adaption of a gain score) might be a better technique if peer tutoring is a goal. However, because this effect is entirely due to the Control vs. no teams, achievement divisions comparison, this result should not necessarily be read to suggest a change in the achievement division component of STAD. In addition, the positive division effects on all of the interpersonal attitude scales suggests that there may be a benefit to using the division technique.

The academic achievement results present an interesting paradox.

Despite large team effects at School 1 on time on task (92.6% of task opportunities in the team conditions, 77.4% in the non-team conditions), no corresponding team effects were found for academic achievement at this school. The division effects on time on task were smaller (87.8% for divisions, 82.5% for no divisions) but still statistically significant ($p < .05$), yet there was no division effect on academic achievement at School 1. Academic achievement was measured in three ways, so it is unlikely that peculiarities of the instruments were involved in this discrepancy. Teacher effects are distributed across main effects by the counter-balanced design, and are thus also excluded as possible explanations. This result should be taken as an indication of how little we know about the relationship of time on task to achievement.

A second interesting finding in the academic achievement results is that there were no team or division effects at Schools 1 and 2, both schools with students who are overwhelmingly white and from farming, working class, and middle class backgrounds, while there were large achievement effects at School 3, a predominately black, working class school. This finding is similar to that of Lucker, Rosenfield, Sikes, and Aronson (1976), who found academic achievement effects due to an interdependent (team) classroom technique among black and Mexican-American students but not among anglos in the same classes. Research on Teams-Games-Tournament (see DeVries and Slavin, 1976), another classroom team technique, has produced comparable findings: Of ten field research projects conducted with TGT, seven showed significant ($p < .05$) TGT effects on academic

achievement. Three of these were in mixed-race schools; four in all white schools. The three non-significant studies all took place in schools that were over 90% white. An explanation for this difference may lie in differences between anglos and minority students in terms of their competitiveness or cooperativeness and peer-directedness. Many studies (e.g. Kagan and Madsen, 1971; Madsen and Shapiro, 1970) have shown that anglo children are more competitive than Mexican-Americans and blacks. Informal observation of the experimental group at School 3 showed a much higher degree of team spirit and team identification than was visible in Schools 1 and 2. It could be that the use of team techniques to increase academic achievement is very appropriate for schools with substantial minority populations, and that using such techniques may reduce the gap between minority students and anglo students without impairing the performance of the anglos (who have never been known to perform less than controls in a team setting).

The lack of effects on satisfaction is unexpected in light of the positive reactions informally noted among the team students. One possible reason for this is that along with the experimental manipulations came a curriculum that was quite demanding. A few students reacted negatively to this aspect of the program. As a result, many of the satisfaction and motivation means actually decreased, and the variances increased.

On the other hand, team effects on students' liking of others and feeling that other students supported their academic efforts were strong at School 1. These findings support a long tradition of research on team techniques which has found these outcomes (see

Slavin, in press, for a review). The lack of significant results at School 3 is probably due to high unreliability, caused by confusion over negatively coded items. Results of the sociometric question, "Who are your friends in this class?" generally support the effectiveness of STAD for increasing mutual attraction, with trends at each school contributing to a significant STAD effect in the combined analysis ($p < .01$).

One problem in using a design with many dependent measures is that the results are usually not as neat or conclusive as they appear in studies with few measures. This is certainly the case in the present study. However, it is clear that the results obtained in this study warrant further investigation into student team techniques in general and Student-Teams-Achievement Divisions in particular.

Implications

The present study joins a steadily growing body of literature supporting the use of student teams in classrooms to achieve multiple outcomes, including increased time on task, academic performance, and most dramatically increased interpersonal attraction among class members (including friendship across racial lines; see DeVries and Slavin, 1975), peer tutoring, and peer support for academic performance. It also contributes a new means of rewarding students for performance net of past performance, the achievement divisions. These techniques are still in need of further development and evaluation, but there are now enough promising techniques and positive results on the various outcomes to justify looking ahead to the possible implications of this research effort.

The American classroom is very firmly based on a mixed competitive-individualistic model. This model has survived because it works. It does a reasonable job of evaluating students relative to one another, and appears to motivate some percentage of students. However, in a democratic society "some percentage" is not enough. The traditional classroom structure has been a poor one for many, particularly for lower class and minority students, but certainly not only these students. There is a clear need for a new classroom model, not to augment, but to replace traditional classroom organizational forms. This new model should be a product of an incremental, outcome-oriented research process. The present study reports on a particular cooperative technique which may have potential as the basis of a cooperative classroom organizational model. Other techniques or combinations of techniques may be more effective in producing the academic, social, and attitudinal outcomes reported here. The significance of this particular study is that it is a step along the road toward the development of a classroom organizational model based on student cooperation and motivation of all students, regardless of past performance.

References

Atkinson, J. W. Towards experimental analysis of human motivation in terms of motives, expectancies, and incentives. In J. W. Atkinson (Eds.) Motives in Fantasy, Action and Society. Princeton, New Jersey: Van Nostrand Company, 1958.

Clifford, M. M. Motivational effects of competition and goal-setting in reward and nonreward conditions. Journal of Experimental Education, 1971, 39.

Deutsch, M. A theory of cooperation and competition. Human Relations, 1949, 2, 129-152.

DeVries, D. L., and Slavin, R. E. Teams-Games-Tournament: A final report on the research. Center for Social Organization of Schools, The Johns Hopkins University, 1976. Report No. 217.

Hamblin, R. L., Hathaway, C., and Wodarski, J. S. Group contingencies, peer tutoring, and accelerating academic achievement. In E. Ramp and W. Hopkins (Eds.), A New Direction for Education: Behavior Analysis, Lawrence, Kansas: The University of Kansas, Department of Human Development, 1971, pp. 41-53.

Johnson, D. W. and R. T. Johnson. Instructional goal structure: Cooperative, competitive, or individualistic. Review of Educational Research, 1974 44: 213-240.

Kagan, S. and M. C. Madsen. Rivalry in Anglo-American and Mexican children of two ages. Journal of Personality and Social Psychology, 1972, 24, 214-220.

Lucker, G. W., Rosenfield, D., Sikes, J. and E. Aronson. Performance in the interdependent classroom: A field study. American Educational Research Journal, 1976, 13: 115-123.

Madsen, M. C. and A. Shapiro. Cooperative and competitive behavior of urban Afro-American, Anglo-American, Mexican-American, and Mexican Village children. Developmental Psychology, 1970, 3, 16-20.

Slavin, R. E. Classroom reward structure: An analytic and practical review. Review of Educational Research, in press.

Slavin, R. E. A new model of classroom motivation. Paper presented at the annual convention of the American Educational Research Association, New York, 1977.

Figure 1

2 x 2 Factorial Design

Factor B: Divisions

Factor A: Teams		No Divisions	Divisions
	No Teams	Teachers A & B (Control)	Teachers C & D
	Teams	Teachers C & D	Teachers A & B (STAD)

Table 1: Summary of Results

	School 1		School 2	School 3	STAD vs. Control
	Teams	Divisions			3 schools combined
Behavioral Observation	(df=1)	(df=1)	(df=1)	--	--
% of time on task					
X^2	37.08***	4.61**	<1	--	--
% of time Peer Task					
X^2	191.85***	8.56***	1.44	--	--
Academic Achievement	(df=1,203)	(df=1,203)	(df=1,170)	(df=1,63)	(df=1,322)
Hoyum-Sanders					
R^2	.566	.566	.364	.492	.476
R^2 inc	.002	.001	.002	.248	.006
F	<1	<1	<1	30.76***	3.99**
Treatment Specific Test					
R^2	.572	.572	.371	.596	.540
R^2 inc	.000	.003	.004	.049	.006
F	<1	1.63	1.00	7.71***	3.98**
Quiz Scores					
R^2	.488	.488	.278	.346	.415
R^2 inc	.004	.001	0	.145	.012
F	1.64	<1	<1	13.94***	5.90**

**p <.05

***p <.01

Table 1 (continued)

	School 1		School 2	School 3	STAD vs. Control
	Teams	Divisions			3 schools combined
Attitudes	(df=1,203)	(df=1,203)	(df=1,170)	(df=1,63)	(df=1,322)
Satisfaction					
R^2	.152	.152	.134	.360	.104
R^2 inc	.003	.002	.017	.018	.006
F	<1	<1	3.25*	1.79	1.99
Motivation					
R^2	.134	.134	.239	.279	1.96
R^2 inc	.017	.005	0	.001	.003
F	3.92**	1.20	<1	<1	1.25
Feeling of Being Liked					
R^2	.302	.302	.173	.356	.303
R^2 inc	.007	.020	.004	.008	. 0
F	2.09	5.95**	<1	<1	<1
Liking of Others					
R^2	.437	.437	.257	.232	.304
R^2 inc	.035	.011	.004	.016	.006
F	12.80***	4.02**	<1	1.30	2.87*
Peer Support for Academic Performance					
R^2	.394	.394	.290	.364	.316
R^2 inc	.061	.013	.013	.013	.027
F	20.58**	4.40**	3.18*	1.24	12.66***

* $p < .10$
** $p < .05$
*** $p < .01$

Table 1 (continued)

	School 1		School 2	School 3	STAD vs. Control
	Teams	Divisions			3 schools combined
Perceived Probability of Success					
R^2	.136	.136	.130	.298	.145
R^2 inc	.014	0	0	.006	.112
F	3.26*	<1	<1	<1	<1
Incentive Value of Success					
R^2	.202	.202	.283	.244	.230
R^2 inc	.002	.003	.002	.002	0
F	<1	<1	<1	<1	<1
Dependence of Outcome on Performance					
R^2	.172	.172	.113	.189	.155
R^2 inc	.017	.002	.001	.010	.003
F	4.28**	<1	<1	<1	1.02
Sociometric Measures	(df=1,203)	(df=1,203)	(df=1,170)	(df=1,63)	(df=1,322)
Friends					
R^2	.333	.333	.359	.349	.386
R^2 inc	.016	.013	.007	.018	.014
F	4.80**	4.02**	1.90	1.74	7.43***
Helpers					
R^2	.228	.228	.024	.135	.067
R^2 inc	.011	.007	.010	.050	.003
F	2.88*	1.71	1.69	3.64*	1.08

* $p < .10$
** $p < .05$
*** $p < .01$